

AN
INTRODUCTION
TO
PATENTS

Patent Department
Bell Telephone Laboratories Incorporated

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Patent Department
Bell Telephone Laboratories, Incorporated

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In recognition of his outstanding contribution to patent consciousness in the Bell Telephone Laboratories, the members of the Patent Department dedicate this book to

RALPH BOWN

with sincere gratitude for his inspiring leadership and warm understanding.

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AN INTRODUCTION TO PATENTS

FOREWORD

This is not a treatise on law. Such books generally frighten the average layman—inventors included—or tend to stifle the normal interest found in a subject outside of one's field of knowledge. So, instead, this is a book *about* law—patent law.

Not all about it, certainly. But enough about a few significant principles to provide, we believe, an essential working tool for an inventor. To be sure, the tool won't be big enough for the many inventors who, for one reason or another, have to rely upon their own knowledge of patent matters. But for Bell Telephone Laboratories inventors it should prove adequate, since they have at their disposal the services of one of the largest corporate patent staffs in the country.

The following pages outline the story of how the patent system has evolved to meet the need for the protection of inventions. Also included is a discussion of what each Laboratories inventor should do as part of his job to make certain that his inventions will be fully protected. And there is an outline of the procedures that an inventor should follow to get his invention to the Patent Department of the Laboratories. Finally, there is an explanation of what an inventor's relation with his attorney should be to enable the attorney to process the invention into a patent that will satisfy all the requirements of the law and provide the Bell System with the full protection that a well-drawn patent will give.

For readers who find that their interest in patents goes beyond this "Introduction to Patents", reference is suggested to more complete patent law texts, a list of a few of which will be found in the Bibliography.

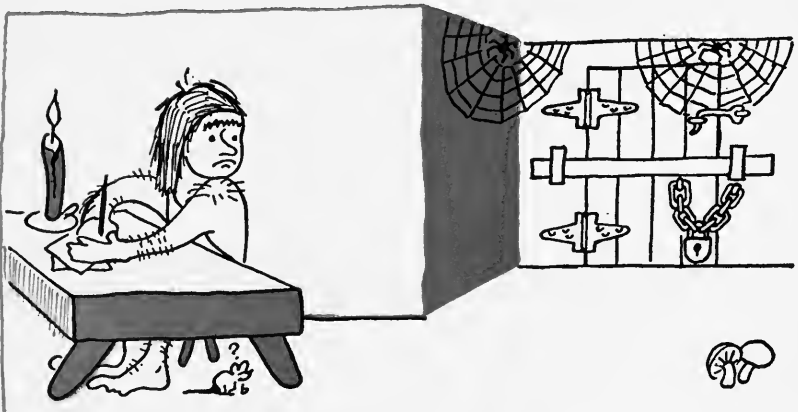
CHAPTER I

PATENT PHILOSOPHY

Most members of the Laboratories know that patents are extremely important to the Bell System. The reasons for stressing the need for patents are less well known. Most of these reasons become apparent, however, in the light of the history and philosophy behind the patent system.

HISTORICAL BACKGROUND

A system often referred to as the forerunner of patents was in active operation in the Mediterranean states during the Middle Ages. Governments were in the habit of granting to favored individuals exclusive rights to deal commercially with certain products or processes. More often than not, the item made the subject of the monopoly was some common device, or even a food staple, the use and sale of which formerly had been open



Secrecy—one alternative to our patent system.

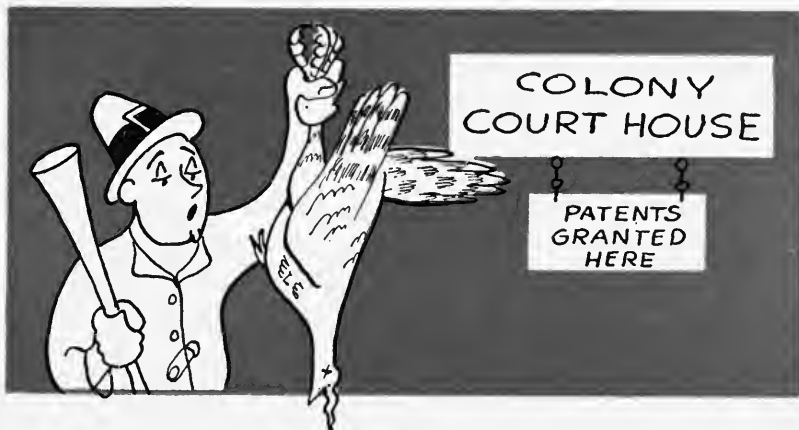
to everyone. In some instances, the subject of the monopoly was an import.

But there was no particular system in force to stimulate or protect new technical ideas. In order to profit from an invention, the inventor had to depend on keeping his process a secret. Closed Shop Guilds frequently owed their existence and prosperity to some closely guarded secret of technical know-how. With such a system, it's easy to understand why technical knowledge spread slowly and why technical advancement was practically non-existent.

The system of monopolies or arbitrary royal grants also developed in England, much to the growing dissatisfaction of the public. When one individual was granted the sole right to produce and sell salt, a right formerly open to everyone, it was somewhat difficult for the Crown to convince the public that commerce in general was benefited. In the 17th Century, the inevitable happened. The populace exerted sufficient pressure against the Crown to force the enactment of a special statute—the Statute of Monopolies. The provisions of this law severely limited the royal power of granting “monopolies”. Commercial rights that had been open to the public could no longer be taken from the public. Instead, royal protection for the use of a process, a device, a manufactured article or the like could be granted only in particular circumstances—normally to the first inventor. As evidence of such protection, the Crown issued Letters Patent, setting forth the terms and conditions of the grant. At this point, of course, the patent process was still very much a matter of royal prerogative and no clearly defined system of rules had yet been established. Nevertheless, the system grew and during the next 150 years became a firmly established part of English jurisprudence. The early colonists brought the idea to America and a number of the colonies established patent laws of their own. The clearest illustration of the importance attached to patents even at that time is the fact that the delegates to our Constitutional Convention adopted, without debate, a provision for a United States patent system. That provision still stands as Article I, Section 8 of the Constitution:

"The Congress shall have power . . . To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

The Congress, on the basis of that Constitutional authority, has enacted detailed legislation on the subject of patents. But the basic purpose of the patent system—"To promote the progress of science and useful arts"—still remains as expressed in the Constitution.



Even the American Colonies had patent laws—of a sort.

NATURE OF THE PATENT RIGHT

The nature of the patent right reflects the Constitutional purpose of the patent system. A patent gives to the patentee the right to prevent others from making, using or selling his invention during the period in which the patent is in effect—17 years. The limitation of the inventor's right to that period is based on the theory, and it's a very realistic theory, that in 17 years sufficient time has elapsed to permit full commercial development and adequate reward for the inventor and his sponsors. In exchange for the exclusive right that is granted to him, the patentee is required to make a full and complete disclosure of his invention to the Government. The Government, by issuing the patent, makes this information available to the public. In the briefest possible terms, that is how the system works.

ADVANTAGES OF THE PATENT SYSTEM

It hardly takes a scholar of patent law to answer the question, "Does our patent system serve its Constitutional purpose in practice?" An easy approach to the answer is to consider what the result would be if our patent system were suddenly abolished. First of all, much of the incentive to create and develop inventions, at least as we recognize incentive in our democratic system, would disappear. Why expend effort and wealth on creating a new invention if the right to profit from it immediately belonged to everyone? Who would be interested in buying an invention to use as the basis for the development or improvement of an industry? Obviously, the purchase of a non-protected invention would be a rather poor use of capital. On the surface, there may appear to be some nobility of spirit in the man who makes an invention and, instead of seeking patent protection, dedicates it to the public "for the good of all". This nobility becomes rather hollow, however, in the face of the hard fact that the risk capital usually needed to promote the initial development of an invention is not to be found unless some measure of protection for that capital is provided, namely, a patent. In the case of our noble inventor who gives his invention to the public, the invention that was meant to benefit everyone may benefit no one.

Providing stimulus for inventors and incentive for the commercial development of inventions tells only a part of the patent story. Every *patented* invention serves as a potential stepping stone for further advancements in the art by others. The same is not necessarily true in the case of an invention that is *not patented*. In the case of the invention without a patent, the natural tendency of the inventor is to try to keep his knowledge secret. But where a patent issues, the new quantum of knowledge uncovered by the inventor is published in a public document. Everyone benefits.

Industrial and scientific progress obviously can exist without the aid of a strong patent system. But whether such progress can result without patents in a democratic society is to be doubted.

Patents are linked too closely to our concept of property rights and our ideas that property rights, whether in real estate or in inventions, should be protected.

SPECIFIC BENEFITS TO THE BELL SYSTEM

Bringing the whole subject closer to home, we may now appreciate more readily what patents do for the Bell System, for the Laboratories, and for the individual inventor at the Laboratories. The Bell System is a service industry. The successful operation of this industry depends on its capacity to provide the best service at reasonable rates. It will continue to have that capacity only with reasonable freedom to take advantage of the best technical ideas that man has produced. The patent system, in turn, is essential to this freedom which must exist if we are to achieve the broad Bell System objective.



High quality Bell System service—patents help keep it that way.

The anomaly of the Laboratories being denied the use of its own inventions is apparent. And yet, without expense and time-consuming litigation, that is precisely the situation that might frequently exist were it not for patent protection on Bell System inventions. Further, as members of a corporation, we all share one broad and basic duty in so far as our work is concerned.

That duty is to contribute to the maintenance of the shareholders' interest in our organization. We will all agree that a shareholder's interest encompasses obvious tangible property, our buildings and equipment for example. Our patented inventions, however, are equally valuable. For a patent, although an intangible, is property in a very real sense. Consequently, the task of obtaining strong patents commands our best efforts.

There is another way in which the patent system contributes to the Bell System objective. Except for patents, inventions outside the Bell System that we find useful in our work might never become known to us. Through patents, however, information regarding the inventions of others is necessarily published and we can then usually acquire rights if they are needed.

SPECIFIC BENEFITS TO THE LABORATORIES INVENTOR

Only one point remains in this discussion of what we choose to call Patent Philosophy. Demonstrating the importance of patents to industry as a whole and to the Bell System in particular is all well and good. But what about the individual Laboratories inventor? The observation that what is good for the System is good for all of its individual members is not particularly satisfying. Stating the question bluntly—does the award of a patent in the name of a Laboratories inventor sufficiently reward him for his efforts? Only the inventor himself can provide the answer. Some considerations are involved, however, that may not be obvious. For example, the value of the professional prestige which naturally comes with official recognition as an inventor should not be overlooked.

Another advantage of patents to the individual Laboratories inventor should be mentioned. The freedom to publish his ideas outside the Laboratories is a valuable asset to any Member of Technical Staff. But that freedom would not exist if it were not for the patent system. By filing applications for patents on any inventions which may be disclosed by the publication, we

can protect our rights in the results of the work. A strict muzzling policy would be the only alternative.

The points in the following summary of the present chapter are worth reviewing if the reader wishes to retain a concise picture of Patent Philosophy.

SUMMARY

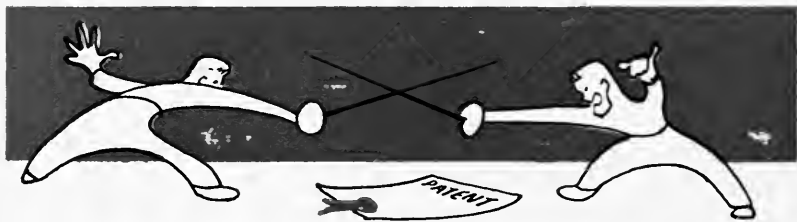
The concept of patents as we know them was first established in England in the 17th Century. At that time, the old system of royally granted monopolies was restricted to provide that the Crown could only grant such exclusive rights in special circumstances—normally to an inventor. The patent system was known in the American colonies and was provided for in our Constitution in order "To promote the progress of science and useful arts". This purpose is achieved by our patent system in that it stimulates invention by affording legally protected rights to inventors, encourages the commercial development of inventions by providing a degree of security for risk capital, and promotes the interchange of technical information by abolishing the need for secrecy. Patents are particularly important to the Laboratories and to the Bell System because they tend to insure our freedom to use the best technical means for providing service. Patents are also important to the individual Laboratories inventor. Personal prestige and the advantages of a liberal publication policy are some of the factors involved.

The history of patents makes it clear that a patent system is essential to technical progress in a democracy. Patents are extremely important to the Laboratories and to the whole Bell System—important enough so that it pays to be informed on the subject; it pays to be patent conscious.

CHAPTER II

THE INVENTION

Obviously an inventor's job is to invent. But following the rules of good patent procedure is also a part of his job. These rules are not only important to an inventor after his invention has been completed—they are equally important before his invention has been completed. Stated as simply and as non-legalistically as possible, in order to insure patent protection, records of all of the work done by the inventor must be kept. Regardless of whether the inventor is an independent or a member of a corporate staff, it is the inventor's responsibility, and his alone, to insure that such records are kept. Any lack of or lapse in the invention records of an inventor creates the possibility that his right to patent protection may be lost. For example, when a legal contest arises, as it sometimes does, between two or more persons claiming the same invention, the general



There is no substitute for legal proof.

rule is that the party *who is able to prove* that his invention was made first is the party to whom a patent will be granted.

But instead of discussing inventions and record keeping and patent procedures in general, it might be more helpful to follow a story about a particular invention and how it came to be patented. By actually looking over the respective shoulders of the inventor and his patent attorney while they work together on the job of patenting an invention, the reader should obtain a fairly clear picture of just how the patent process works. The story is fictional although it is identified with an actual invention that was made at the Laboratories and subsequently patented. The device which provides the backdrop for our fiction is the Cold Cathode Stepping Tube. The high order of professional skill demonstrated by the actual inventor, not only by the invention itself but also by all of his exemplary work in connection with the patenting of the invention, is most deserving of imitation. However, our fictional inventor, one Ned Feedback by name, is a most unpredictable and inconsistent character. He represents both the novice and the expert inventor. Consequently, his actions serve to emphasize some important points. No resemblance to any person, living or dead, is intended, and none should be inferred.

USE OF PATENTS FOR ENGINEERING RESEARCH

The story begins in the Murray Hill Laboratories early in 1946. Mr. Ned Feedback, a Member of Technical Staff, was working on a research project, a part of which concerned cold cathode gas tubes, including the study of possible new applications and improvements on such tubes. One of the tools that Ned required on this particular project was a very thorough knowledge of the most recent developments in the cold cathode field. He had already completed a fairly comprehensive survey of most of the pertinent technical literature—the texts, the

treatises and the scientific periodicals. Being an experienced researcher, Feedback didn't stop there. He was aware, as most experienced inventors are, that patents frequently make up a significant source, and sometimes the only source, of technical literature on a given subject. And Feedback knew that the Laboratories Patent Department maintains a file of several hundred thousand patents, which includes practically every United States patent ever issued relating to electrical communications and to allied fields.

Feedback realized, however, that despite an elaborate classification system, the job of locating the patents pertaining to a particular narrow field is often a difficult one. So he decided to seek professional assistance in his quest for patents relating to cold cathode tubes. The simple expedient of checking the Patent Department organization chart gave Feedback the name of the patent attorney who specialized in patent matters dealing with electron tubes.

Now every Laboratories inventor should have at least a general knowledge of how the Patent Department is organized. The arrangement is very similar to that of a technical department in the sense that the various divisions and subdivisions are made on the basis of technical subject-matter. For example, one division deals with telephone switching systems. Subdivisions cover narrower fields of technical subject-matter, such as electronic switching, transistors, television and power systems. Consequently, for any given area of Laboratories work, one can always locate a Laboratories patent attorney who is somewhat of a specialist.

The patent attorney whom Feedback went to see, H. Corpus by name, had been working in the field of electron tubes for a number of years. Corpus gladly gave Feedback the benefit of his personal knowledge of some of the more recently patented developments in the cold cathode tube art. Moreover, Corpus located a number of patents covering cold cathode tubes, and discussed them with Feedback.

THE PARTS OF A PATENT

Feedback didn't know much, if anything, about the technical side of patent law. But he could do what every inventor should be able to do; he could read a patent specification and then discuss it intelligently. An understanding of the composition of a patent—the parts of a patent and the purpose of each part—is helpful toward that end. The first part of a patent is called a specification. The specification is a complete description of the invention covered. As a matter of fact, the law requires that the description must be so complete and accurate that it will serve to teach anyone who is skilled in the particular art to practice the invention. The specification also usually points out the advantages of the invention claimed and why it is considered to be better than what has been done before.

The second part of a patent is a drawing, or a set of drawings, illustrating at least one embodiment of the invention and its principles of operation. The drawings, of course, serve to supplement the specification, the description of the invention.

The final part of a patent is made up of short numbered paragraphs that follow the specification. These paragraphs are called claims. The claims are precise definitions of the exact features of the invention which the patent protects. The claims serve to stake out the boundaries of the area from which the patentee can exclude others, just as a deed defines a geographical area from which the property owner can exclude others. At any rate, Feedback was familiar with the basic composition of patents and as a result he was able to use the patents effectively in his research work.

PATENT DEPARTMENT RESEARCH AIDS

In addition to providing Feedback with patents that were pertinent to his field of research, Corpus brought Feedback's attention to several suggestions, new ideas concerning cold cathode tubes, that recently had been submitted by other inventors in the Laboratories. These were suggestions then being considered

by the Patent Department for possible patent protection. Corpus located those items for Feedback by referring to the Patent Department's exhaustive subject-matter index system. This system, the Keyword Index, enables the searcher to enter the file with either specific or general subject-matter in mind and to discover whether any invention disclosure, Technical Memorandum, or other document pertaining to that subject has previously been considered by the Patent Department. This Index is available to all of the Laboratories and is often helpful as an aid in tracking down technical correspondence that cannot be located by other means.



If it's a technical document you're looking for,
the Patent Department may be able to help.

It is interesting to note, then, that Feedback had occasion for useful contacts with the Laboratories Patent Department and the subject of patents even before his invention entered the picture.

RECORDING THE INITIAL IDEA

On September 10, 1946, Ned Feedback was working alone in his laboratory at Murray Hill. Somehow it occurred to him that cold cathode gas tubes might be especially useful if they could be constructed to perform certain pulse counting functions. Any discussion of creative thinking and how inventors

do it is well beyond the scope of this book. However, there is one basic principle of creative activity which happens to coincide with a basic principle of good patent procedure. The principle is a simple one—an idea should be put in writing *at the time the idea occurs*. An obvious purpose is to nail the idea down so that it won't be forgotten. As far as patent procedure is concerned, the purpose of recording ideas when they occur is to provide the inventor with a source of evidence that will enable him to prove that he in fact had the idea.

We have already noted that, in a legal contest between two persons both claiming the same invention, the party who is able to prove that he was the first inventor generally will be the one to whom the patent will issue. Now, of course, there are different ways of proving things. For example, in a great many legal situations ordinary oral testimony may by itself be considered as sufficient proof. But in patent law an inventor's oral testimony that he conceived a certain invention on a certain date can never be accepted as evidence amounting to adequate proof. Additional evidence is necessary. Without such a requirement, an honest patent applicant would be completely at the mercy of an unscrupulous applicant who might easily swear falsely to an earlier invention date. As a result, the courts and the Patent Office require some form of corroboration to support the inventor's word. Corroborate means "strengthen"—and that's what a proper written record does to an inventor's testimony. An inventor's written record of his conception of an invention is not in itself, however, considered to be corroborative evidence. But when such a written record can be verified by a witness to the effect that the record was in fact made on the particular date, and the subject-matter was understood by the witness, then corroboration is present.

There are other forms of corroborative evidence in addition to an inventor's witnessed notebook. One type of corroboration that is particularly recommended and which should be used more frequently by members of the Laboratories is a notebook entry by the witness *in his own laboratory notebook*. A brief description of what was witnessed, together with a statement that the

matter witnessed was understood, is all that is required. The entry should, of course, be signed and dated.

PROPER RECORD KEEPING FORM

When written records are presented as a part of the corroborating evidence in establishing an invention date, the precise form and type of record used is important. As far as the law is concerned, any complete written record will do. As far as sound practice is concerned, there is no substitute for a standard laboratory notebook. Laboratory notes recorded on scratch paper or in miscellaneous personal notebooks have the unfortunate habit of disappearing, usually when they are needed the most. An inventor's standard laboratory notebook is always available, however, since it is always retained on file as a part of the official records of the Laboratories.

Now let's examine Mr. Ned Feedback's record keeping habits. On the same day that he first began to formulate his idea about designing cold cathode tubes, he made his first entry on that subject in his standard laboratory notebook. Here, in part, is a reproduction of what he recorded.

Case 20879

9/10/46

It has occurred to me that a cold cathode gas tube can be designed to give simple and reliable pulse counting with a minimum of dependence on circuit parameter, tube characteristics and signal amplitudes. Such a pulse counting device would be extremely useful for a number of applications.

The notes continue on, listing a number of possible uses for the idea of a pulse counting cold cathode tube, including a frequency meter, an interval timer, a frequency divider, a telephone switching device and others. Now for a number of reasons it is apparent from this single notebook entry that Ned was an inventor blessed with some knowledge about the principles of record keeping. First, note that he recorded his idea at the time the idea occurred. Second, he used his official laboratory notebook, and, a point we haven't mentioned, his entries were made in ink. There is certainly nothing sacred about ink notebook entries as opposed to penciled entries. There is no law that requires ink entries—except the law of common sense. Pencil entries smudge easily and invite easy erasure. Smudges prove nothing and erasures permit the inference that changes were made with the intent to deceive the reader as to the true original content. In such a situation it is clear that the value of the document or notebook as a piece of evidence is questionable. One more point to Feedback's credit—note that his entry is dated and is further identified by the engineering case number of the particular project on which he was working.

With Ned's appreciation and awareness of patent matters, he also knew that his idea, as far as he had progressed with it, was not something that could be classified as patentable subject-matter. Ned was aware that an idea stated merely in the form of a technical objective cannot be the subject of a patent. An idea of that sort usually marks the first step on the road toward invention. But before we can talk about it in terms of patentability, this initial idea or technical objective must be joined with a conception of some means of putting the idea into practice.

Referring again to Feedback's notebook, we find that on the same day on which his original entry was made, he entered a rough sketch of a particular arrangement of electrodes in a cold cathode gas tube, together with a brief description of how such a device would function as a pulse counter. At the moment we are more concerned with the manner in which the information was recorded than with what was recorded. It is well to note that Feedback took considerable pains to insure continuity in his

entries—to avoid any possible later inference that entries had been changed, removed or added. For instance, at the bottom of the first page we find this notation:

Continued next page (page 20) 9/10/46
N. Feedback

At the top of the second page the date was entered in the space provided and the following notation headed the page:

Pulse counter continued from page 19

Where corrections or rearrangement of entries were necessary, Feedback drew lines through the unwanted words, phrases or sections. All such changes were dated and initialed. There were no erasures, obliterations or blank spaces. The entry for that first day was completed at the bottom of the second page. The close of this entry was marked by the date and by Feedback's signature. One additional step remained—the notation of a witness was required. A point worth remembering in this connection is that the witness must not have been a joint or co-inventor for his testimony would be accorded no more weight than Feedback's. Technically, the requirement for a witness would be met if Feedback merely exhibited his notebook to a second party, presuming that the second party understood the notebook entry in question. Or Feedback could have orally explained his idea to a witness. Recognizing the frailty of human memory, however, the only practical solution is to have a witness read the notebook entry, make certain that the witness understands the entry, and *then* have the witness sign and date the entry together with a statement that he has read it and understood it.

This is the procedure Feedback followed. He had one of his associates, B. I. Nary, perform the witnessing function. In the notebook we find the following entry under Feedback's signature:

Read and Understood
B. I. Nary 9/18/46

The alert reader may already be puzzled by the fact that Feedback's first day of notebook entries on his cold cathode tube idea was not "Read and understood" by B. I. Nary until eight days had passed. Here a finger of criticism must be levelled at Feedback. Obviously, the purpose of Nary's entry was to corroborate the date on which the invention was conceived. However, a lawyer isn't needed to arrive at a conclusion that the fact that B. I. Nary read and understood Feedback's entry on September 18, 1946, hardly corroborates a contention that Feedback had his initial idea on September 10, 1946. In such a circumstance the earliest provable date of conception is the date of corroboration.

It might be well to emphasize at this point that all of these details about record keeping are not presented with any thought that an inventor's primary mission in life should be to serve as a routineer—a keeper of accurate notebooks. Nevertheless, it is well to keep in mind the fact that in a given case each of the seemingly picayune points made thus far conceivably could be the difference between a patent and no patent. A few more points of equal importance remain.

KEEPING RECORDS OF REDUCTION TO PRACTICE AND DILIGENCE

We have already used the term "conception". In patent law this term has a precise legal meaning. An invention comes into being by the process of conception—the formulation of a complete mental picture of some technical objective and a mental picture of some tangible means of achieving that objective. Before the invention can be patented, however, it must be "reduced to practice".

Now reduction to practice can be actual or it can be constructive. In the case of an actual reduction, the invention is put to an actual and successful physical test. Filing a complete application for patent with the U. S. Patent Office, on the other hand, constitutes a constructive reduction to practice. An application must, of course, be prepared and filed also in the case where there has been an actual reduction to practice.

Mention has already been made of the fact that in a legal contest between inventors, each claiming the same invention, being able to prove the conception date of the invention is extremely important. Being able to prove that you reduced your invention to practice and when it was reduced to practice are equally important. And finally it is important to be able to prove that after the conception of your invention you exerted reasonably continuous efforts toward reducing the invention to practice or, in patent law language, that you were *diligent*. For the moment we will assume that Ned Feedback has the proper entries in his notebook to prove a *conception date*. Keeping in mind the possible need for proof of a *reduction to practice date* and for proof of *diligence*, the reader may now judge for himself how well our inventor Ned Feedback scored on those points.

Following Feedback's initial few entries concerning his cold cathode pulse counter, his notebook indicates that he continued working on his invention, albeit without much in the way of success. Nothing occurred to indicate that his original idea was unsound or impractical but certain problems in the details of

design and construction, however, did make progress slow. Finally, on March 15, 1947, this notebook entry appears:

*Attempts to construct a cold
cathode pulse counting tube have
thus far been unsuccessful.
The pressing importance of other
work at this time makes
abandonment of the project
necessary.*

To classify this entry as unfortunate would indeed be an understatement. It very well could have resulted, and as the reader will learn later in the story almost did result, in the loss of patent protection on Feedback's invention. It should be obvious that if the need to prove diligence should arise, Feedback's position would certainly be poor in the face of his notebook entry indicating the very opposite of diligence. Another objection to the notebook entry concerns the use of the word "abandonment". The law specifically provides that, if an invention has been "abandoned", it cannot then be patented. "Abandoned" has a precise legal meaning when used in this sense and refers to the relinquishing of the right or opportunity to obtain a patent. While the law is clear that abandonment of a project does not necessarily constitute the abandonment of an invention in the strict legal sense, it is still preferable to avoid the use of the word in connection with invention records.

After the March 15, 1947 entry, Feedback's notebook indicated that for a period of several months he worked on a variety

of projects, none of which served to advance the status of his cold cathode pulse counter. But on January 10, 1948, we find the following entry:

The counting tubes described on pages have not been made to operate reliably because a suitable geometry has been difficult to achieve. It has been difficult to arrange so that a conducting anode will be extinguished at the time anode transfer occurs.

Apparently, work on the project was again under full steam. Several entries follow the one on January 10, 1948, explaining new possible approaches to the problem, illustrating a variety of details in tube construction and associated circuits, and diagramming possible advantageous wave forms for input pulses. There is at least an inference then that Feedback had found the time to do some work on the project between March 1947 and January 1948, despite the notebook entry indicating that he had abandoned the idea. But in all probability the only work done was a series of unsuccessful experiments. It is, of course,

true that you cannot obtain a patent on a device that cannot be made to operate. However, the point that Feedback apparently failed to realize was that if the need to prove diligence should arise, being able to prove all of the work done toward a reduction to practice would be important—even the work done in connection with unsuccessful experiments.

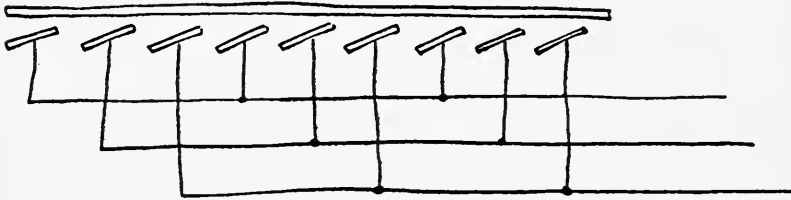


The experienced inventor records *all* experiments—
even unsuccessful ones.

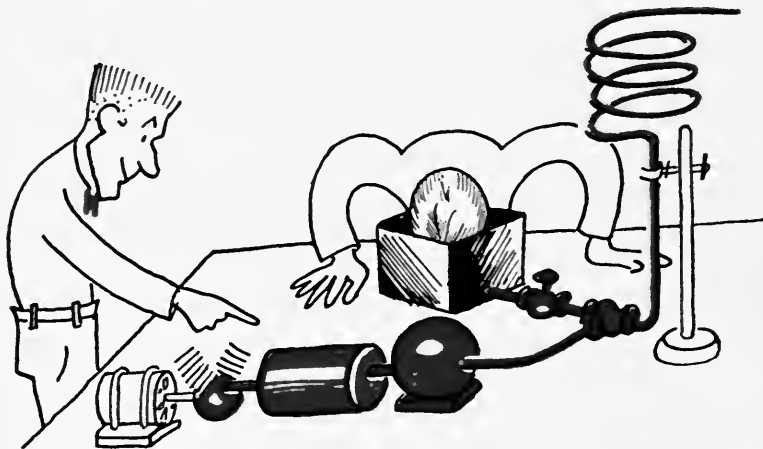
The next series of Feedback's notebook entries was made in exemplary fashion. Every entry was in ink and was dated at the beginning and at the end. An entry continued on a succeeding page was so indicated. Feedback signed his name by the date at the end of each entry, followed by the "Read and understood" entry dated and signed by B. I. Nary. An entry of particular interest was made on January 24, 1948. On that date a tube designed as UA 325 (Type 1618) embodying Feedback's initial concept of a cold cathode stepping tube was described, and after a series of illustrative sketches and the careful listing of various test data, the following notation was made:

Operation was satisfactory

Feedback's schematic sketch of the device looked something like this:



By applying the proper potential to the common anode, and by introducing successive pulses to the sets of cathodes, the glow discharge of the tube was in fact made to move in the proper direction from cathode to cathode and thus perform the function of counting the pulses. The tests demonstrated clearly that the tube and its associated circuit fully performed the intended functions. The faithful B. I. Nary was present to assist in and to witness the test. Feedback was obviously aware of the necessity of having a witness available who could corroborate his reduction to practice should the need arise. He apparently was aware



In a reduction to practice the witness must observe and understand *all* of the features of the invention.

also of the requirement that the witness of a reduction to practice must not only understand the test but he must actually see it work—all of it. For instance, if some of the circuitry used in connection with Feedback's tube, assuming that such circuitry included some of the inventive features, had been enclosed or in some fashion hidden from B. I. Nary's view, there is a good chance that Nary's testimony would be useless for the purpose of corroborating the reduction to practice.

This is a point worth stressing. Court records show case after case in which the witness of a reduction to practice failed to observe the operation of circuits hidden behind a panel, or failed to see the arrangement of a gear train under a housing cover or failed to look at certain components of an invention that were enclosed in a box. Each one of those cases resulted in the loss of potential or existing patent rights. Happily, that particular pitfall didn't exist in Feedback's case. Acting under Feedback's advice, B. I. Nary, the witness, was careful to observe all the elements of the test and made certain that he understood how the device operated. At the conclusion of the test, Nary made the following entry in Feedback's notebook immediately following Feedback's dated signature:

Witnessed and Understood
January 24, 1948
B. I. Nary

The above entry, together with B. I. Nary's testimony, would in all probability be acceptable as good evidence of a reduction to practice. In certain instances, however, it is desirable to take additional precautions to insure that reduction to practice can be proved. We have already mentioned the value of having the witness of a reduction to practice make an appropriate entry in his own notebook. In the case of an invention that is known to

be particularly important, and where there may be delay in filing the patent application, it may be desirable to provide for someone other than the inventor to reduce the invention to practice, that is, to construct the device and test it. If such a procedure is followed, there can never be any doubt as to what the witness saw since he was the one who reduced the invention to practice and necessarily observed everything. Furthermore, the testimony of such a witness does not require corroboration.

With the successful test of his tube, Feedback was sure that the time for formal patent consideration had arrived. However, the exact time when such a step should be taken is not always obvious.

WHEN TO REQUEST PATENT DEPARTMENT ACTION

There is certainly no hard and fast set of rules that an inventor can use to determine whether, on a given project, he has reached the point where a request for formal patent advice is appropriate. In certain areas of research it is desirable to initiate formal patent consideration on an invention before an actual reduction to practice has taken place. In other instances it may be more desirable to wait until after reduction to practice. If there are any general rules of thumb to follow in answering the question, one would be to consult a patent attorney if there is a doubt involved. But perhaps the best guide to follow is the principle that it is always preferable to request patent action too early than too late. The worst consequence of acting too early is apt to be a request from the patent attorney for additional information. On the other hand, if the request is delayed too long, the filing date of the patent application is, of course, delayed too, which may result in losing the opportunity for patent protection.

The importance of being able to prove an early reduction to practice date has already been pointed out. In this connection it is well to remember that the filing of a patent application is a constructive reduction to practice and the date of that filing can always be proved since the date the application is received by the Patent Office is a matter of official Government record.

One situation in particular calls for early action on the part of inventors. In the case of large projects, complex systems development work for example, it is desirable to notify the Patent Department as soon as the likelihood of patentability questions becomes apparent. Such notice will assist the Patent Department in programming its work and will expedite the completion of important new items.

The steps that an inventor is required to take when he requests patent action are discussed in the next chapter. But before continuing on, it would be well to take one final look at the principal points covered thus far.

SUMMARY

Having a knowledge of patents and the Patent Department may be useful to a Laboratories inventor even before he submits a suggestion for patentability consideration. Patents frequently provide a valuable source and sometimes the only source of technical literature on a given subject. Also, the Patent Department technical subject-matter index is often helpful to members of the Laboratories outside the Patent Department. Patent attorneys are always available to assist members of the Technical Departments in these matters.

When two or more inventors apply separately for patent protection on the same invention, a legal contest arises to determine who is entitled to a patent. In such a contest, the respective claimants are normally required to prove certain facts. These facts may include the date the invention was conceived, the date the invention was reduced to practice and whether diligence was exercised in reducing the invention to practice. The testimony of an inventor-claimant standing alone is, as a matter of law, considered insufficient to prove conception, reduction to practice or diligence. To be accepted as proof, an inventor's word must be corroborated by independent evidence, usually the testimony of another witness. The best way to insure that the required cor-

roboration will be available when needed is to maintain witnessed laboratory notebook records. In connection with keeping such records, the most important rules to remember are the following:

1. Keep a notebook record in ink.
2. Sign and date notebook entries when made.
3. Have one or more witnesses sign and date all entries that could possibly be used as proof of conception, reduction to practice or diligence, recording the fact that the witnesses understood the subject-matter witnessed. As an additional precaution, it is sound practice for a witness to record the fact of his witnessing in his own notebook.
4. Remember that a co-inventor cannot corroborate.
5. Remember that for corroboration of a claimed reduction to practice, the witness must be able to testify to a personal knowledge at the time of the test or demonstration as to all the features of the invention being tested as well as a knowledge and understanding of the results of the tests. The witness should record the fact that he did witness the test.
6. When making corrections or rearrangements in a laboratory notebook, lines should be drawn through unwanted words, phrases or sections. All such changes should be dated and initialed.
7. Never erase or otherwise obliterate notebook entries. Do not leave blank spaces or blank pages.
8. Never record that any particular line of inventive effort has been "abandoned". Later developments may prove such a decision to have been incorrect but it may then be impossible to overcome the legal implications created by the use of the word.
9. Never keep any records of technical significance on loose sheets of paper. Sketches, drawings, photographs, data sheets and other like material should also be dated,

signed and witnessed. When practical, these should be permanently secured on blank sheets of the notebook.

10. When in doubt with respect to the patent aspects of record keeping, obtain advice from a Laboratories patent attorney.

If in doubt as to when or whether to request Patent Department action, a patent attorney should be consulted. In any event, it is always preferable to submit a request too soon rather than too late.



Even in the flush of success—the informed inventor keeps a record.

CHAPTER III.

THE DISCLOSURE

In the broad sense the patent law definition of a disclosure is the act of an inventor whereby he divulges his invention or makes it known to another person. As we normally use the term in the Laboratories, a disclosure is an inventor's written statement or description of his invention. Usually the disclosure includes a technical memorandum with drawings or sketches together with a forwarding memorandum. The forwarding memorandum presents a brief summary of the subject-matter of the technical memorandum and specifically requests patentability consideration. If the Patent Department concludes that the invention should be patented, the patent attorney, in preparing the formal patent application, uses the inventor's disclosure as his primary source of information. All other things being equal, the better the inventor's disclosure, the better the patent application. Consequently, the preparation of the disclosure deserves the inventor's best efforts.

PREPARING THE TECHNICAL MEMORANDUM

Turning to the matter of Feedback's disclosure to the Patent Department, here is how he did the job. First, he prepared a Technical Memorandum concerning his cold cathode tube suggestion, written in the general form recommended in his own department. The memorandum was brief and yet complete, thorough and yet not unnecessarily complex, technically accurate and yet lucid. And there were clear, readable sketches covering not only basic principles of operation but also illustrating the circuitry of each suggested application. Finally, there were large scale, well-labeled sets of curves illustrating basic tube

characteristics. The reader can judge for himself whether all of this high praise for Feedback's efforts is merited for here is a reproduction of a part of his Technical Memorandum taken from a section covering "Principle of Operation", together with three of the sketches referred to:

Principle of Operation

A simple 4-stage stepping tube is shown in Figure 1. It comprises two groups of cathodes which are connected either to ground (A cathodes) or to the common pulse input lead (B cathodes). The common anode is connected to the positive power supply through a load resistor.

Assume that prior to time t_0 the discharge is established to one of the A cathodes, for example A_0 . At time t_0 a negative voltage is applied to the pulse input lead causing all of the B cathodes to become negative with respect to the A cathodes. Because of the discharge already present to A_0 , the discharge will easily transfer to either B_0 or B_1 and, if the negative pulse is large enough, the increased voltage drop in the anode resistor will cause the glow on cathode A_0 to be extinguished. When the pulse is released at time t_1 , the discharge will transfer back to one of the A cathodes.

In order to cause the discharge to progress around the tube, it is necessary to provide a preference mechanism which makes the discharge always transfer in the proper direction at the beginning and at the end of each pulse. If, for example, at time t_0 cathode B_1 is always preferred to cathode B_0 and then at time t_1 cathode A_1 is preferred to cathode A_0 , a single input pulse will move the discharge from A_0 to A_1 . At the beginning of a second input pulse the discharge will move to B_2 and at the release of the pulse it will move to A_2 , so that the discharge steps one position for each complete pulse.

One simple means of obtaining the preferred direction of transfer is to use the specially shaped cathodes shown in Figure 2A. The four cathodes might, for example, represent B_0 , A_0 , B_1 , and A_1 of Figure 1. The cathodes are constructed with a hollow "U"-shaped portion with an extended plane portion. It is known that a properly shaped hollow portion is a more efficient cathode in a glow dis-

charge than a plane or convex surface. Consequently, the cathodes shown operate with the glow discharge concentrated in the hollow portion. This is indicated by the shaded area at the right of cathode A_0 . When the negative pulse is applied to the B cathodes it can be seen that the plane portion of B_1 projects into the region of high ionization density, making transfer occur at a relatively low negative voltage. Cathode B_0 , on the other hand, is located in a region of low ionization density so that a large negative voltage would be required to cause transfer to it. Since both of the B cathodes are at the same potential, transfer always occurs to B_1 in preference to B_0 . During the pulse, the discharge concentrates at the right-hand end of B_1 so that the same mechanism operates to cause transfer to A_1 at the end of the pulse.

The preference in favor of the forward direction is illustrated by Figure 2B which shows the negative voltage re-

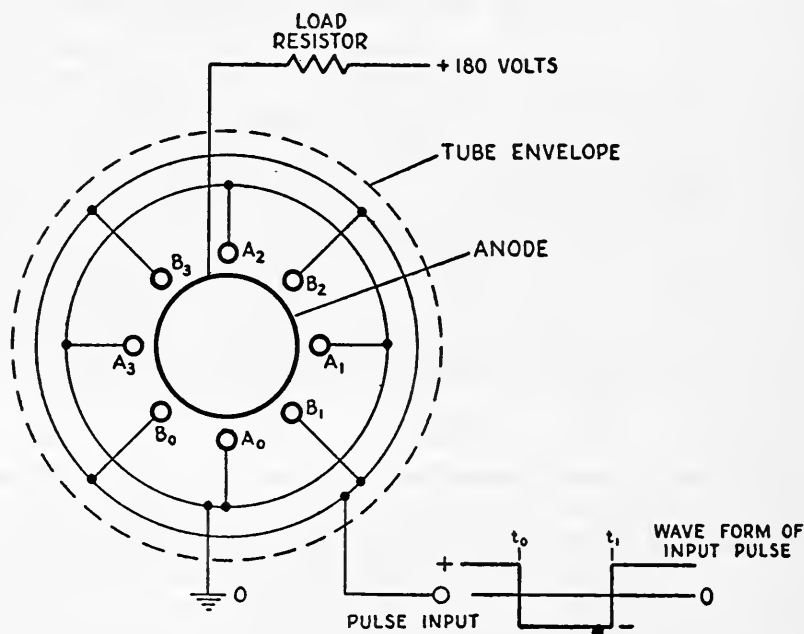


FIG. 1
SIMPLE FOUR STAGE STEPPING TUBE

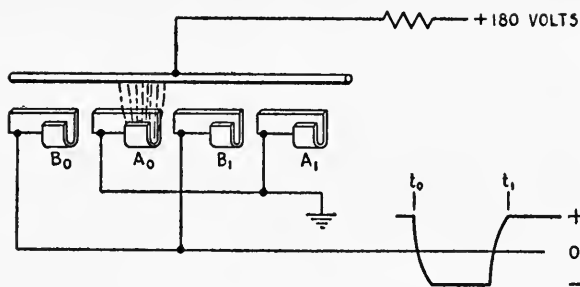


FIG. 2A

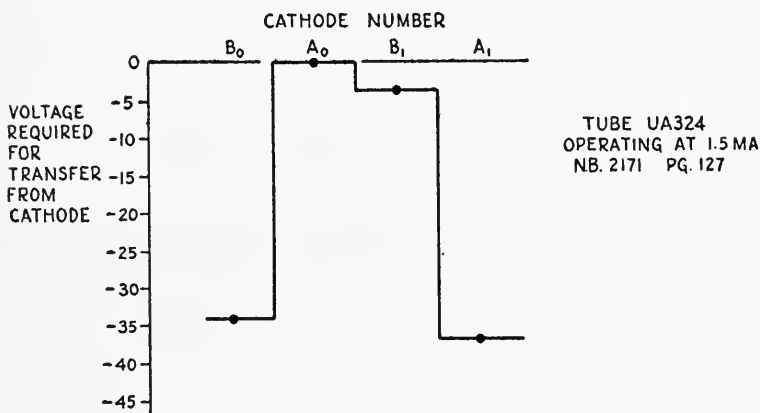


FIG. 2B

FIGURE 2.

- A) CONSTRUCTION OF CATHODES AND REGION OF HIGH IONIZATION DENSITY WITH CONDUCTION TO A₀
- B) TRANSFER VOLTAGE REQUIRED TO MOVE DISCHARGE FROM A₀ TO ADJACENT ELECTRODES.

quired to transfer the discharge from cathode A₀ to other adjacent electrodes. For example, approximately 4 volts are required to cause transfer in the desired direction to B₁ while 34 volts are required to cause transfer in the reverse direction to B₀.

The entire Technical Memorandum was prepared in the same clear and concise manner. Obviously more complex inventions would require more involved treatment—longer explanations and more intricate drawings. On the other hand, many adequate disclosures consist only of a simple sketch and a brief forwarding

memorandum. The scope of the subject-matter presented is of course the controlling factor. But, regardless of the particular invention involved, the basic principles guiding the preparation of a good technical description would still apply.

PREPARING THE FORWARDING MEMORANDUM

Feedback's next step in the process of requesting formal patent consideration of his idea was the preparation of a forwarding memorandum submitting his Technical Memorandum to the Patent Department. The forwarding memorandum was addressed to the General Patent Attorney. With equal propriety it might have been addressed to the Division Patent Attorney (the same level of supervision as a Technical Department Head) in charge of the appropriate subject-matter. This forwarding memorandum was prepared for the signature of Feedback's own Department Head.

Occasionally, one hears discontented mumbling about the burdensome administrative procedures required of Laboratories inventors in connection with patent matters. Ned Feedback happened to know, however, that complaints of that nature are based on a lack of understanding rather than on fact. First, Ned knew that in an organization as large as the Laboratories, orderly, businesslike administrative procedures are essential. And secondly, he was aware of the advantages in the procedure of having all invention disclosures forwarded to the Patent Department through a Technical Department Head. No one is in a better position to pass initial judgment on an invention disclosure than the person with the responsibility for all of the technical work involved in the field of the disclosure. The resulting expert screening process to which all suggestions are subject is a factor contributing to the average high calibre of the disclosures now reaching the Patent Department. More than half of these invention disclosures actually result in patent applications filed in the Patent Office.

A part of the high ratio of patent applications to invention disclosures stems from careful preparation of forwarding memoranda. Rarely over a few pages in length, the forwarding

memorandum serves the purpose of informing the reader, almost at a glance, of the precise field of the invention, the exact features of the invention considered to be novel, the use to which the invention will presumably be put and its relative importance in its field. No elaboration is needed to point out that a memorandum organized in that fashion will go far toward promoting prompt and full consideration of an invention disclosure at every step of the way.

As to the exact form of the memorandum, there is no required standard. A workable and convenient form is available as a guide but obviously other arrangements might serve equally well. Ned Feedback happened to follow the suggested method of presentation in his forwarding memorandum and here is what he wrote:

A Cold Cathode Pulse Counting or Stepping Tube—Case 20879

April 27, 1948

MR. G. PAT ATTORNEY:

This memorandum is for the purpose of transmitting to your department information concerning a new type of cold cathode glow discharge tube and new circuits utilizing this tube which have been invented by Mr. Ned Feedback. It is requested that a study be made to determine whether the inventions are patentable.

Objective

- 1) To provide an electronic stepping switch which is simple, small, reliable and capable of operating at high speeds.
- 2) To provide pulse counters, frequency meters and time interval measuring devices utilizing a pulse counting tube.

Definition

The new device comprises a multiple-element cold cathode glow discharge tube in which a discharge is made to move from one element to the next as a result of the application of pulses to a single pulse-input lead, and asso-

ciated operating circuits. The stepping action is achieved within the tube by a special cathode geometry which results in a preferred direction of transfer of the discharge from one electrode to another in the tube when the stepping voltage is applied. Paragraph 2 of the attached technical memorandum describes the general principles of operation. Paragraph 3 gives circuits for utilizing the tube.

Features

The new features of this invention are believed to be:

1) A multiple element cold cathode glow discharge tube having cathodes so arranged that the discharge concentrates at a preferred position on the electrode, this concentration being utilized to initiate a discharge in a preferred succeeding breakdown path at a later time. This is called a "preference mechanism" in the following paragraphs.

2) A tube having the above defined preference mechanism connected with a circuit to provide a visual indication of the number of pulses which have been applied to a single input connection.

3) A tube having the above defined preference mechanism connected with a circuit to provide an electrical output signal which corresponds to the number of input pulses. The several methods of doing this "reading" are described in Paragraph 3 of the attached technical memorandum.

4) A tube and circuit as defined in 3) above with a gate of known duration applied to an input signal of unknown frequency. The number of input pulses is then a measure of the frequency. This is a frequency meter as described in the attached technical memorandum.

5) A tube and circuit as defined in 3) with a source of input pulses having a constant known frequency with a gate in the pulse input circuit controlled by a time interval to be measured. The number of input pulses indicated by the tube is then a measure of the time interval. This is a device for measuring an unknown time interval, or a clock, as described in the attached technical memorandum.

(Several additional features were also listed)

*Comparison**

It appears that the new tube is a preferred method of achieving the stepping function for many applications, especially in telephone applications.

Use

Possible uses of the new stepping tube are listed in Paragraph 4 of the attached technical memorandum. An immediate use of the tube is expected to be in a dial pulse register circuit and active development of a suitable tube is being pursued.

Importance

It appears to be urgent that patent action be taken because of the potential usefulness of the device and because of the active interest of other laboratories in this problem.

D. PARTMENT HEAD

It may be well to note again that the particular form used by Feedback is not too important. What is important is that the memorandum clearly stated the specific action requested, "that a study be made to determine whether the inventions are patentable" and that it neatly summarized all of the major points to be considered in conjunction with such action.

Having completed the preparation of his invention disclosure, Feedback submitted it to his Department Head for screening and approval. This important step completed, the disclosure was forwarded to the Patent Department. There it was designated as a "Job", a standard unit of Patent Department work, and assigned an identifying Job Number. Next it was routed to the attorney whose fields included electron tubes and who, not by coincidence, was the attorney who had previously discussed the matter with Feedback, Mr. H. Corpus by name. What Corpus did with Feedback's disclosure is explained in the next chapter. First, however, a brief review of the main points covered in the present chapter.

* In cases in which an inventor knows of other inventions, methods or developments that are alternative or closely related to the subject-matter of his own disclosure, such information should be identified here by reference to patents or other sources.

SUMMARY

Submitting an invention disclosure is an important step in the patent process and considerable care in its preparation is warranted. The patent attorney will normally discuss the disclosure with the inventor but this procedure cannot be considered as a substitute for a clear and complete disclosure.

The first step in writing a disclosure is the drafting of a Technical Memorandum, following the form in use in the inventor's Technical Department. Clarity and completeness are the goals to aim for. Sketches are usually helpful and should be included. The second step is the preparation of a forwarding memorandum, addressed to the General Patent Attorney or appropriate Division Patent Attorney, over the signature of the Technical Department Head. The forwarding memorandum should contain a request for some specific action and should cover the following, or roughly equivalent, points concerning the invention:

- Objective
- Definition
- Features
- Comparison
- Use
- Importance
- Identification of the
Inventor or Inventors

Thorough screening of all disclosures by Technical Department Heads is conducive to a high ratio of patent applications filed to disclosures submitted.

The quality of a patent application can certainly be no better than the patent attorney's knowledge of the invention. His primary source of information about an invention is the inventor's written disclosure. Carefully prepared disclosures are conducive to well-prepared patent applications and good patents.

CHAPTER IV

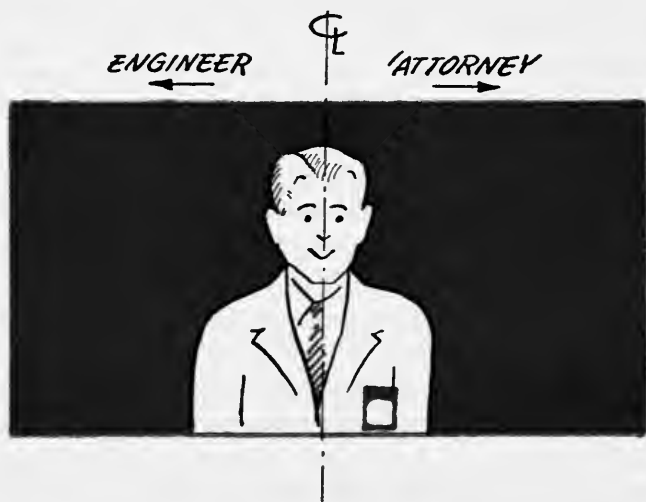
THE PATENT APPLICATION

The preparation of a patent application is in itself a complex job. But a patent attorney must do a great deal of work before he undertakes the actual drafting of the application. The entire process requires painstaking attention to the many niceties and fine points that are a part of patent procurement work. From an inventor's viewpoint, however, the details of this process are unimportant. It will be more profitable to take a general look at Corpus' work and to consider the reasons for the major steps involved. With this approach an inventor will gain at least some insight as to what goes on and why between the preparation of an invention disclosure and the filing of a patent application. To sharpen that insight, however, an inventor should first have a little understanding of patent attorneys in general—what kind of people they are and how they operate.

CHARACTERISTICS OF A PATENT ATTORNEY

Most Laboratories inventors who are just starting out in their profession really know very little about patent attorneys. As a result, many of these young inventors are inclined to look toward the inventor-attorney relationship with some misgivings. One of these stems from the fairly common belief that lawyers have carefully developed a complex legalistic jargon of their own, just to confuse and mystify the layman. But there is certainly no basis for this belief, at least as far as Laboratories patent attorneys are concerned. In many respects, their efforts are more closely identified with engineering or scientific pursuits than with ordinary legal work. As a matter of fact, all of our patent attorneys have had extensive engineering or scientific training.

Many began their careers as engineers. The primary qualifications for engineering or scientific work, technical knowledge and an inquisitive attitude, are also essential for good patent work.



Portrait of H. Corpus.

Another characteristic of a good patent attorney is an ability to translate his technical knowledge into precise and concise technical and legal language. He must be able to apply his engineering talents within the framework of patent law and to grasp the niceties of distinction, comparison and contrast—all essential in drafting a patent application. Perhaps the most important point to remember is that the Laboratories patent attorney is trained basically as an engineer—that he knows engineers and talks like one.

The reasons why a Laboratories patent attorney must have a good foundation in technology in addition to legal training are illustrated by the work that Corpus did in connection with Feed-back's disclosure.

STUDYING THE DISCLOSURE

Corpus' first step in the process of procuring a patent had nothing to do, oddly enough, with patents or patent law as such. His first job was a detailed study of Feedback's disclosure—detailed enough for him to gain a complete and thorough understanding of all of the technical matters presented. We already know that Corpus was well informed on the subject of cold cathode tubes, having specialized for a number of years in patent work dealing with the electron tube art. Nevertheless, he did encounter one snag. He found some difficulty in following the circuitry that Feedback had proposed in connection with a suggested use of the stepping tube with audio signals. A brief informal conference with Feedback quickly solved that problem. Corpus knew, as do all experienced patent attorneys, that when some point in a disclosure needs clarification, the best source of information is always the inventor himself. It is this sort of cooperation between inventor and attorney that produces the best patents.

LEGAL CONSIDERATIONS IN FILING PATENT APPLICATIONS

When Corpus concluded that he had a good grasp of all the technical details of the disclosure, he was ready for the next step—deciding whether the preparation and filing of a patent application was warranted. This decision involved both legal and practical considerations. First, the legal considerations.

The primary conditions and requirements for obtaining a patent are found in the United States statute covering patents. This law is supplemented and interpreted by the Rules of Practice promulgated by the Patent Office and by the decisions of the Patent Office and Federal courts in cases involving patent procurement and patent litigation. The patent statute itself is fairly simple and concise, at least when compared with many U. S. Statutes. In part, it reads as follows:

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the (following) conditions and requirements . . ."

Since the statute specifies that a patent may issue only to one who "invents", an obvious question arises—What is an invention? The term is not defined in the patent statute except for the less-than-helpful statement that "The term 'invention' means invention or discovery". The Patent Office Rules of Practice likewise fail to define invention. Moreover, the courts, after a number of unsatisfactory efforts, no longer attempt to define the term. Finally, all patent scholars are in general agreement that the term is incapable of exact definition.

THE GUIDEPOST FOR INVENTION

The situation, however, is not quite so hopeless as it might seem. Finding out whether invention is present in a given case is somewhat like travelling down a road; invention is at the end of the road. Whether you arrive at the end of the road (invention) depends first on whether you can stay on the road and second on whether you can clear the road blocks that have been placed along the way. Staying on the road requires reference to a road sign, or guidepost, that points toward invention. This guidepost is one that has been established by the almost numberless decisions that have been made in patent cases by the Patent Office and by the Federal courts. Briefly, the guidepost is a partial test for the presence of invention. It provides that an invention, no matter what kind of an invention, *must* produce some new result or function, or some known result in a new or better way. So long as the device under consideration passes that test, you are at least on the road and the possibility of reaching the end of the road exists.

APPLYING THE GUIDEPOST TEST

In considering Feedback's disclosure to see if invention was present, Corpus first checked to determine whether the guidepost put the stepping tube on the road to invention. The purpose of the tube was to count electrical pulses. This was its function—obviously a known function since a variety of arrangements using tubes, relays or other devices had been used to count pulses long before Feedback developed his own tube. But possibly Feedback's tube performed the old function in a new way. In searching through all of the patents relating to the field, Corpus failed to discover any pulse counting arrangement involving the use of a single tube in which the electrodes were so constructed and arranged that pulses were counted by the progressive activation of successive electrodes and the quenching of preceding ones in the way proposed by Feedback. This combination for counting pulses was apparently new. Therefore, Corpus was ready to proceed down the road toward invention. But he could only reach a final determination of invention if Feedback's tube could avoid the road blocks. Actually, there are a great many of these invention road blocks. Pointing out a few of the major ones, however, will be sufficient to illustrate Corpus' problem.

INVENTION ROAD BLOCKS

The most important one concerns the matter of "obviousness". Regardless of whether a device passes the guidepost test—a new result or function or a known result in a new or better way—it must not be an "obvious" modification or improvement of something already known. The patent statute is very specific on this point. It states that a patent "may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." In other words, mere difference or newness, standing alone, is not sufficient to avoid the road block. The

difference or change must not be obvious to a person having ordinary skill in the particular art. Instead, the difference or change must have a particular quality—it must have a degree of ingenuity over and above that to be expected in the work of a skilled mechanic.

Another road block to invention concerns the rule that generally no patent will be granted if the only difference over what has been done before consists merely of a change in size, shape, adjustability or portability; or of a substitution of material; or of other like minor changes.

There is one way, however, in which this obstacle may be cleared. If the difference, no matter how minor, produces some new, startling or unexpected result, the road block will have been avoided. For example, there is a well-known patent case concerning a complex machine that produced paper. It was a good machine, but it produced paper slowly. The paper industry struggled for years with the problem of how to speed up production. Finally, one inventor discovered that by merely raising one end of the machine some twelve inches off the floor—a simple change in mounting—the production of the machine was doubled. Here was a case of an extremely minor change—but with a startling and unexpected result. Invention was held to be present and the validity of the patent was sustained.

Still another road block is the one which provides that a device cannot be an invention if it is a mere “aggregation” of known parts. An aggregation is held to exist if each of the known parts merely produces its usual result so that the final result of all the parts is only the sum of the results of the individual parts. For example, the fellow who first placed an eraser on the end of a pencil thought he had an invention, and the Patent Office agreed with him, granting him a patent. But when the validity of the patent was tested in a court action, it was decided that no invention existed—only an aggregation of parts. The pencil would still only write and the eraser would still only erase. No new function or result was produced.

The last of the more prominent road blocks along the road

to invention is the doctrine of equivalents. This doctrine provides that there is no invention in replacing an element or a part of a known device with an element or part which, at the time of the act, was known to be capable of performing substantially the same function as the element replaced.

Plodding down the road to invention with Feedback's tube in tow, Corpus concluded that the tube not only stayed on the road as measured by the guidepost—the tube produced the old result of counting pulses in a new way—but he also concluded that every road block, the ones noted above and numerous others, could be hurdled successfully. In the opinion of Corpus, the stepping tube was an invention.

PATENTABILITY REQUIREMENTS OTHER THAN INVENTION

Returning to the patent statute, it is clear that Corpus had a great many requirements to consider in addition to the requirements for invention. The following brief outline of the quoted part of the statute, together with a few explanatory notes, will help to point out the reasons for the rest of Corpus' conclusions concerning the patentability of Feedback's tube.

The statute specifies "Whoever invents or discovers . . . may obtain a patent". Thus, the inventor, and only the inventor, may obtain a valid patent.

The statute also defines the subject matter which may be patented,—a "process, machine, manufacture or composition of matter".

A "process", within the meaning of the statute, is a method of producing some new physical result or an old physical result in a new and better way. For example, a particular method for producing silicon wafers for use in transistors would be proper subject-matter for a process patent. A particular method of conducting a business would not since no physical result would be involved.

A "machine" may be defined as a device or a combination of devices by which energy can be utilized or by which some operation can be performed.

A "manufacture", broadly speaking, is anything made by man's industry. It comprises some physical structure. Neither a product of nature nor a natural element, even a newly discovered one, is a "manufacture" within the meaning of the statute.

A "composition of matter" is the product resulting from the intermixture of two or more ingredients which has properties different from those of the ingredients individually. It may be a mechanical mixture or a chemical compound.

The statute embraces not only a process, machine, manufacture or composition of matter, but also "any . . . improvement thereof". Thus, a process, machine, manufacture or composition of matter need not be necessarily an entirely unique or radically distinct entity to be a proper subject for patent protection. It may represent or constitute an improvement of a known entity—an advance in the arts or science.

Finally, the statute states "new and useful". The requirement as to "new" overlaps in substantial measure the requirement for "invention" which we have already discussed. "Useful" means that the subject-matter must have utility, its use must be beneficial as distinguished from illegal or pernicious.

TIME REQUIREMENTS FOR PATENTABILITY

Finally, the statute establishes conditions to which all of the other requirements for obtaining a patent are subject. The essence of these conditions is time. The more important ones may be summarized as follows:

An inventor *cannot* obtain a valid patent

1. If the invention was known or used by others before his own invention.
2. If the invention was patented or described in a printed

publication *anywhere in the world* before his invention, or more than one year before the filing of his application for patent.

3. If the invention was in public use or on sale in this country more than one year before the filing of his application for patent.

For each of the patentability requirements we have listed, and for a number of additional requirements too, Corpus reached the same conclusion. Feedback's tube met the test. It was an invention, it was new, it was useful, it embraced a category of patentable subject-matter and it was not barred by the conditions concerning time. These were the primary legal considerations involved in deciding whether to file the patent application. Before making his final decision, however, Corpus had a few practical considerations to deal with.

PRACTICAL CONSIDERATIONS IN FILING PATENT APPLICATIONS

Meeting all of the legal requirements may insure the eventual grant of a patent, but it certainly will not insure that the protection gained will be valuable to the Bell System. Is it likely that the Bell System will ever use the invention? Is the degree of novelty so slight that the cost of preparing the patent application might be greater than the value of the protection that the patent will give? What is the likely trend of Bell System development in that field?

These are some of the questions that must be answered. If the inventor's written disclosure is a good one, as good as the one submitted by Feedback, the patent attorney will already have had many of these questions answered for him. For example, the forwarding memorandum which was a part of Feedback's disclosure contained one paragraph on USE and another on IMPORTANCE. These provided Corpus with ready answers to most of the questions noted above. All of these answers pointed toward the desirability of obtaining patent protection on Feedback's tube.

PREPARATION OF THE APPLICATION

With the decision to file made, Corpus started on the preparation of the patent application itself. At the same time, the Patent Department notified Feedback's Department Head of the action that was being taken.

The makeup of a complete application for a patent requires a number of legal documents, but the heart of the application consists of a specification or description of the invention, a set of drawings illustrating at least one embodiment of the invention and a set of claims. There is no hard and fast rule laying down the order in which these parts of the application should be prepared. In cases in which the novel features are particularly complex, involved switching systems for example, many attorneys prefer to draft the specification, or at least a part of it, before starting the claims. In other cases many attorneys prefer to follow Corpus' procedure in drafting a few of the claims first. Here is the first claim that Corpus prepared:

1. A gaseous discharge device comprising a plurality of cathodes, each having two portions of different efficiency as glow discharge elements, the portion of greater efficiency of each cathode being opposite the next succeeding cathode and the portion of lesser efficiency being toward the next preceding cathode, and an anode opposite said cathodes.

Recalling our earlier discussion about claims—their function is to define the features of the invention believed to be novel in order to stake out the boundary lines of the area from which other persons can be excluded. Good claim drafting requires a certain amount of creative thinking. By applying his creative talents to the job, a patent attorney is often able to go beyond the bare statements in a disclosure that set forth the features believed to be novel. In this way, claims can be formulated to cover the invention in its broadest aspects. In order to insure the drafting of the best possible claims, many attorneys find it desirable to discuss them informally with the inventor at a fairly early stage. For example, despite the fact that Feedback knew nothing about the intricacies of claim drafting, he was able to

give an opinion as to whether certain claims, or groups of claims, captured the full sense of his ideas. Such opinions are always valuable to a patent attorney.



Cooperative effort pays off in good patents.

Drafting the application is the part of the patent procurement procedure for which the patent attorney is wholly responsible. Accordingly, although the inventor may be called upon from time to time for advice on questions of technology, he is more or less out of the picture during the actual drafting process. But Ned Feedback learned that a Laboratories inventor is never very far away from the subject of patents in one form or another. As a matter of fact, while H. Corpus was working on the application, Feedback became involved in certain incidents that serve to illustrate the omnipresent aspect of patents in the Laboratories. These incidents are described in the next chapter. First, the following summary will serve as a brief review of the most important points about a patent application—the decision to file it and its preparation.

SUMMARY

Upon the receipt of an invention disclosure, a patent attorney's first job is to reach a decision as to whether a patent application

should be filed. A thorough understanding of the disclosure is a prerequisite to such a decision. In that connection, the inventor's help is frequently required. The decision to file is based on both legal and practical considerations. The legal requirements that a patent application must meet are stated in U. S. statutes, court decisions and Patent Office Rules.

Probably the most difficult legal requirement to meet is that the subject-matter of a patent must be an invention. If the subject matter produces some new result or function or some known result in a new or better way, invention exists unless one of the specific road blocks is in the way. These road blocks include the test of obviousness, the rule concerning very minor differences such as changes in size or shape and the doctrine of aggregation. The application must meet certain other requirements involving the element of time.

The practical factors affecting the decision to file an application include an evaluation of the worth of the potential patent protection being considered. The potential use of the invention and the scope of the protection obtainable are the main elements involved.

The review and approval of patent applications is an important inventor function that should be done with care. To do the job well, a knowledge of patent fundamentals is essential.

CHAPTER V

THERE'S MORE TO PATENTS THAN PATENTS

A good many people seem to feel that an inventor's contacts with the Patent Department are limited to matters involving patent procurement. At least that was Ned Feedback's belief. By experience, however, Ned learned that one may frequently be involved in other matters that concern Patent Department interests and responsibilities.

THE NEED FOR CLEARANCE BEFORE PUBLICATION

For example, there was the time when Feedback received a very flattering letter from an electrical engineering society of which he was a member. It seems that the society had learned that Ned had been doing some very interesting work in the field of cold cathode tubes. "Would you consider the preparation of a paper concerning some of your recent work in the electron tube field? We feel that material of this type would be of considerable interest to the readers of our publication, the 'Electronics Journal'." That was about the way the request was phrased.

Feedback felt a certain amount of understandable pride in this opportunity to publish something about his work. To Feedback's credit, he did have a fleeting thought concerning something he had heard about "publication clearance" or "patent considerations". But obviously nothing like that could apply to his proposed article. There was clearly no military security aspect in what he intended to write. Furthermore, the technical information involved was certainly no secret to the Patent Department; Corpus was already working on the preparation of the patent application. So, Feedback started drafting his technical paper on the subject of cold cathode tubes. He explained the nature of the

work in which he was then engaged, going into considerable detail about the features of his new cold cathode stepping tube.

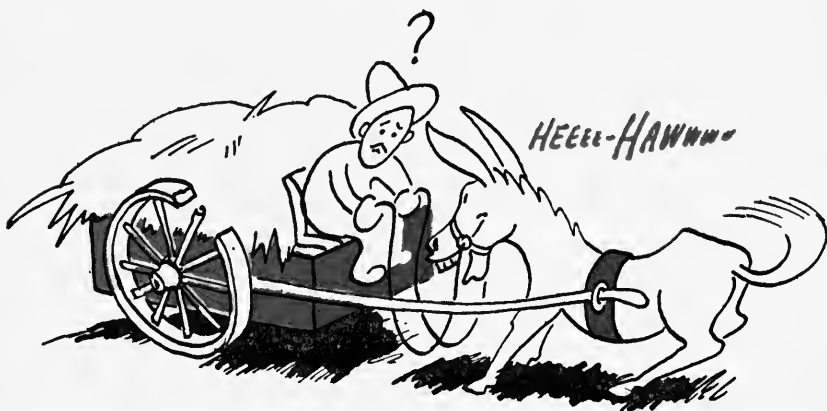
When the paper was finished, Feedback, almost as an afterthought, decided it might be well to drop a word into the ear of his supervisor, I. M. Sage, just to let him know that Feedback's reputation in scientific circles was about to receive a good boost. To Feedback's chagrin, his supervisor was not entirely happy with the situation. Sage began by explaining a few facts about "publication clearance" and why the Patent Department was involved in it. He even suggested that sending the paper off to the Electronics Journal without patent clearance could result in dire trouble for one Ned Feedback. Certain that Sage was being unduly cautious, Feedback reminded him that the Patent Department had all the material covered in his paper. He also pointed out that the Patent Department was already preparing a patent application on the subject-matter. And he brought up the point that no military security problem was involved. But I. M. Sage, being hard to convince as supervisors sometimes are, still insisted that specific clearance from the Patent Department was required before Feedback's work could be published. He was right too—for the following reasons which he explained carefully to Feedback.

First, the Laboratories has a legitimate interest in anything concerning Laboratories work that is to be published. From the standpoint of public relations and other general policy considerations, it is often important to insure optimum timing in the release of information. These matters are the responsibility of the Publication Department, which serves as a clearing house or coordinating group for the publication of all information about Laboratories work. Clearance is required not only for material prepared for written publication, but also for the release of information to be disclosed orally—for instance, in talks to professional groups. Any material of a technical nature submitted to the Publication Department for clearance is in turn forwarded to the Patent Department. Which brings us to the second point.

Regardless of whether technical material has been previously submitted to the Patent Department for patentability considera-

tion or for other reasons, the matter of publication raises entirely new questions. For example, there's the matter of Feedback's disclosure. Suppose that Feedback had sent his paper off to the Electronics Journal for publication before Corpus completed the preparation of the patent application. Where would the danger lie? First, there is no assurance whatsoever as to the amount of time that might elapse after the publication of the paper and before the patent application is filed in the U. S. Patent Office. Quite possibly, more than a year might pass. If as much as one year did elapse, Feedback's application would meet head on with the rule of law noted in the previous chapter—that if an invention is described in a printed publication more than one year prior to the filing date of the application in the United States, no valid patent can be obtained.

A second danger would be present even if less than a year passed between publication and filing. It is certainly within the realm of possibility that another inventor could independently have conceived the same invention—perhaps shortly before, or shortly after Feedback. Such a person, upon reading a publication disclosing the features of Feedback's invention could logically be stimulated into taking some action. Such action might be the filing of a patent application. Even assuming that the unknown inventor's conception of the invention took place *after* Feedback's,



Publishing before obtaining patent clearance.

the filing of an application for patent by the unknown inventor could subject the Laboratories to costly and time-consuming litigation. And if Feedback were unable to *prove* his earlier conception date, it could mean the loss of patent protection.

Still another danger would be created by publishing information about Feedback's invention before filing a patent application. In many instances it is desirable for the Bell System to secure patent protection in certain foreign countries. The filing and prosecution of foreign applications is considered sufficiently important so that all of the major decisions in that field are made by the General Patent Attorneys of the American Telephone and Telegraph Company and the Western Electric Company. These decisions are usually based on the recommendations of a Foreign Committee which includes patent attorneys from the American Telephone and Telegraph Company, Western Electric Company and the Laboratories, and representatives of the Patent Licensing Division of the Western Electric Company. Some foreign countries have a rigid rule with respect to granting patents on inventions described in a publication. The rule is that if there has been a publication *anywhere* before an application for patent is filed in that country, no valid patent can be obtained. As a result, a publication made even after an application has been filed in the United States, could mean the loss of patent rights in certain foreign countries.

MECHANICS OF PUBLICATION CLEARANCE

When Supervisor Sage finished explaining these points in detail, Ned Feedback was thoroughly sold on the wisdom of requesting official clearance before sending his paper off to the Electronics Journal. He made the standard request to the Publication Department. In accordance with its usual procedure, the Publication Department referred the matter to the Patent Department. By that time, H. Corpus had filed the United States patent application. Applications had also been filed in selected foreign countries. Corpus gave approval for publication, and in a matter of a few weeks the whole clearance routine was completed. In cases where some urgency exists, and if the material involved is

reasonably brief and not overly complex, it is not unusual for publication clearance to be granted in a shorter period of time.

At any rate, Feedback was able to send off his paper to the Electronics Journal without appreciable delay. Needless to say, however, he was still a little unnerved. Feedback hadn't endangered any of the Laboratories patent rights. But on the other hand, he hadn't missed doing so by very much. Without the timely intervention of the patent conscious I. M. Sage, some extremely valuable patent rights might have been jeopardized and perhaps lost. To say that Feedback's position would have been awkward in that event is a rather extreme example of an understatement. It is a fair assumption that Feedback resolved to give more attention to such matters in the future.

DANGERS IN ACCEPTING DISCLOSURES FROM OUTSIDE SOURCES

Frequently, Laboratories inventors are asked for advice about inventions by persons outside the Laboratories. More often than not the advice seeker has an idea that he believes to be of possible interest to the Bell System. The telephone is such a familiar part of our everyday life that a great many non-professional people have ideas about how telephone service or equipment might be improved. The Laboratories is, of course, always interested in receiving such suggestions. Nevertheless, extreme care must be exercised in handling ideas from outside sources. Unless certain established procedures are carefully followed, very serious problems may occur. Ned Feedback became involved in one incident that illustrates the point.

One evening at a small social gathering, Ned was introduced to a Mr. C. O. Axial who apparently was aware of Ned's position as a Member of Technical Staff of the Laboratories. It seems that Mr. Axial, who worked with communication and electronic circuits as a hobby, had an idea about an arrangement that would, according to Mr. Axial, bring about a marked improvement in telephone service. Fortunately, Feedback knew precisely how to handle the situation. His patent-wise supervisor, I. M. Sage, had

already briefed Feedback on the subject of how the Laboratories deals with ideas submitted from outside sources. Even before Mr. Axial launched into a discussion of his idea, Feedback was careful to explain the Laboratories policy on such matters—that the Laboratories is always interested in suggestions from persons outside the Laboratories—that the Patent Department is charged with the responsibility of receiving such suggestions—and finally, that anyone interested in submitting a suggestion or an invention should deal directly with the Patent Department. In other words, no member of the Laboratories should take it upon himself to receive or consider an outside invention or suggestion on behalf of the Laboratories. By knowing and following this policy, Feedback wisely avoided some possible problems.

These problems usually arise through misunderstandings. One source of potential difficulty is that frequently a suggestion that seems new to a person outside our organization may already be well known to us either as the result of our own efforts, or because it has already been called to our attention by others. The fact that we may not be using a particular idea of course cannot be taken to mean that we are not familiar with it or that we may not decide to put it into use at some future time. In this situation there is always a possibility of misunderstandings, disputes and even litigation on the subject of what idea belongs to whom. This is reason enough for the careful procedures followed by the Patent Department in dealing with outside suggestions.

Mr. I. M. Sage, Feedback's supervisor, was understandingly pleased to know that his protege was making good use of his newly acquired knowledge about patents and Patent Department procedures. Knowing that experience is frequently not the best teacher, Sage took it upon himself to make a further addition to Feedback's patent education.

THE RIGHT-TO-USE PROBLEM

Sage started the new lesson with a question that went something like this— Suppose that a patent is eventually granted on the cold cathode stepping tube, and suppose also that a deci-

sion has been made to put the tube into actual use—say in a number of central office switching systems throughout the country. The Western Electric Company is prepared to go into production. The Laboratories, having developed the tube, will of course supply the necessary information, plans and specifications to the Western Electric Company. Now—before any such plans or specifications can be released to Western Electric, what important precaution must be taken from a patent standpoint?

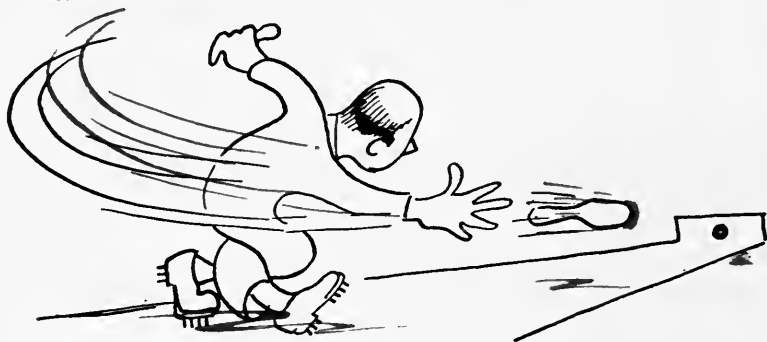
Feedback thought the question over carefully. Here was an article, the tube, which had been invented and patented at the Laboratories. The heart of the matter seemed to be whether these facts were enough to permit manufacture and use of the tube by the Bell System. Feedback remembered that the owner of a patent has the legal right to prevent others from making, using or selling the patented article. Since the tube in question was patented, it therefore seemed obvious that the way would be clear for the manufacture and use of the tube by the Bell System. With this reasoning Feedback concluded that Mr. Sage had merely posed a trick question—there were no additional patent precautions necessary.

As most Laboratories inventors would know, Feedback was dead wrong in his conclusion. I. M. Sage patiently explained why. Before any manufacturing information—drawings, specifications or the like—can be released to the Western Electric Company, it is essential that clearance first be obtained from the Laboratories Patent Department. Such clearance is necessary *regardless* of whether the material concerned is the subject of a patent. On receipt of any such request for clearance the Patent Department initiates a procedure aptly called a right-to-use study. Even if the subject of the study is covered by a Laboratories patent, it is necessary to determine whether there are dominating patents owned by others, under which the Bell System has no license or only a restricted license. Such patents might prevent us from making, using or selling the material sought to be released.

For the purpose of explaining the characteristics of a dominating patent, we can go back again to the story of the pencil with

an eraser attached. Let us assume for the moment that the addition of the eraser was invention and that a patent on this "improvement" was granted to its inventor, A. Let us also assume that another inventor, B, holds a patent that permits him to exclude others from making, using or selling pencils. Consequently, the patent of B is said to dominate the patent of A. Accordingly, if A manufactures and markets pencils with erasers attached, he will infringe the rights of B. B, of course, cannot equip his pencils with erasers without infringing the rights of A. One solution to such an impasse is the exchange of license rights.

In making the right-to-use study, the patent attorney proceeds somewhat differently than in a patentability study. First, he is only concerned with unexpired "outside" patents—patents not owned by the Bell System. Second, he is concerned primarily with the *claims* of these patents. A feature merely described in the specification of a patent or shown in the drawing is not "protected" by the patent and, therefore, does not bar manufacture, use or sale. If the Bell System is licensed under patents containing claims of interest, additional research must be undertaken to discover the precise terms of the license, for instance whether the license agreement permits use and sale outside the Bell System, or only use in the Bell System. Of course, right-to-use studies must also be made in the cases involving new non-patented equipment or processes that are scheduled for production or use.



Releasing manufacturing information before having
a right-to-use study made.

The right-to-use problem occupies a considerable amount of attorney time in the Patent Department. As a result, right-to-use studies are undertaken only when the use or production of some new item is considered imminent. In one aspect, the right-to-use study calls for even greater care and thoroughness than a patentability search. The failure to uncover some existing, pertinent prior art in a patentability search might only mean wasted effort in the preparation of a patent application. But a similar failure on a right-to-use problem could result in litigation, with a Bell System company as the defendant in an infringement suit—infringement being the unauthorized invasion of the patent right of another.

One final point about right-to-use clearance—a point with which all inventors should be familiar. Patent Department right-to-use clearance is only required for new apparatus, systems, machines, tools, materials and the like when these new items *differ materially* from previous standards or approved types. Very minor changes do not require clearance. But when a number of successive minor changes are made, it is a simple matter for these *minor* changes to be compounded into material differences. Consequently, if standard or previously approved equipment has been subjected to more than a single minor change and new production or use is planned, consideration must be given as to whether the combination of such changes has produced a material difference. In making such a decision, it is certainly better to err on the side of caution and request a new right-to-use clearance.

With the conclusion of Sage's brief dissertation on the right-to-use problem, Feedback was more convinced than ever that there was more to the business of patents than he suspected.

PATENT QUESTIONS IN WORK UNDER GOVERNMENT CONTRACTS

Sage, being the ideal supervisor, was interested in having Feedback know as much about patent matters as Sage did himself. So, before Feedback realized it, he was pondering over another

one of Sage's questions: "What do you know about patent procedures in connection with work done under Government contracts?" Feedback realized that he couldn't reason his way through to an answer so he gave a brief but informative reply, "Nothing."

Sage, needing no further invitation, pointed out that research and development contracts entered into by the Laboratories for military or other Government work contain specific clauses dealing with inventions and patents. Many of these clauses are fairly technical from a legal standpoint and are of no particular concern to most members of the Laboratories. Perhaps the most important single point for inventors to remember is that the Laboratories usually does have certain rights in inventions that are made in connection with work done under Government contract. The false assumption is often made that such inventions always become the sole property of the Government. While it is true that in some instances the Government may proceed with the patent prosecution work involved, it is also generally true that the Laboratories is entitled to license rights under the patents that issue in connection with Government contract work. In other cases, the Laboratories assumes the responsibility for the patent work, gains title to the patents and grants license rights to the Government.

Since the Laboratories normally does have an interest, or a property right, in all inventions arising under Government contracts, the need for all members of the Laboratories to follow the proper procedures to protect such inventions is two-fold. First, there is the usual obligation of protecting Laboratories property, and second, there is the legal obligation imposed by the contracts which require protection of any inventions made. Specifically then, the same precautions that are urged upon Laboratories inventors for the protection of all of our inventions made in connection with Bell System work must also be observed in contract work. The same need exists for careful notebook procedures, for timely submission of disclosures and for proper publication clearance.

Having explained the position of the Laboratories in dealing with inventions made under Government contracts, Sage suggested to Feedback that he acquire copies of the Military Engineering Methods Bulletins, which deal specifically with the administration of various types of clauses under such contracts. In this connection, Sage pointed out that certain of the responsibilities of an engineer will vary under different Government contracts and, accordingly, the most recent issues of the pertinent M.E.M.B.'s usually provide the answer to any current problem.

With the conclusion of his supervisor's informal instruction period, Feedback was reasonably certain that he had learned all there was to know about patents—at least all that was worth knowing. But there were still a few painful lessons ahead of him. Feedback learns about those in the next chapter—Patent Prosecution.

SUMMARY

The necessity for Laboratories inventors to be familiar with the subject of patents involves more than record keeping and the preparation of invention disclosures. Patent Department clearance is required before any publication about Laboratories work is made—whether the publication is written or oral. If information about Laboratories inventions is published without clearance, it can result in the loss of valuable patent rights—both United States and foreign.

The Laboratories is always willing to consider invention suggestions from sources outside the Bell System. Certain risks are present, however, in the handling of such suggestions. Misunderstandings can arise which can result in costly litigation. Accordingly, the Patent Department is charged with the responsibility for handling all work done in connection with outside inventions. Careful procedures must be followed if risks are to be avoided. Any outside invention suggestions presented to members of the Laboratories should immediately be referred to the Patent Department.

The release of information, drawings, instructions, bulletins or specifications concerning new apparatus, systems, machines, tools, processes and materials differing materially from previous standards or approved types shall not be authorized without first obtaining clearance from the Patent Department. Before clearance is granted, right-to-use studies must be completed in order to avoid the risk of infringing on the patent rights of others. Right-to-use studies must be undertaken regardless of whether the subject-matter involved is covered by Bell owned patents.

Inventions made in connection with work done under Government contracts must be protected by the same procedures observed for the protection of any other invention made in the Laboratories.

Before delivering talks based on Laboratories areas of technical interest—obtain publication clearance.

Before publishing papers or articles based on Laboratories areas of technical interest—obtain publication clearance.

If approached about the consideration of outside inventions by the Laboratories—refer the matter to the Patent Department.

Before transmitting information for the manufacture, sale, lease or use of new apparatus, systems, machines, tools, processes and materials differing materially from previous standards or approved types—obtain Patent Department approval for all patent questions involved.

CHAPTER VI

PATENT PROSECUTION

The term patent prosecution normally refers to the actions taking place from the time that a patent application is filed with the Patent Office until the time that a patent is issued or the application is finally rejected. A great many of the procedures taking place during this period are highly technical in a legal sense and, therefore, are of no particular interest to the inventor. However, a surprisingly large number of these procedures are of direct concern to the inventor—enough so that it is well for him to have some idea of the mechanics involved.

APPLICATION APPROVAL BY THE INVENTOR

The reader may recall that we left our patent attorney, H. Corpus, while he was putting the finishing touches on Feedback's patent application. When the preparation of the application was completed, a draft was submitted to Feedback for his inspection and approval. The primary purpose of that step was to provide a final check on whether Corpus had described the invention completely and accurately. In addition to checking the specification or the description of the invention, the inventor should also check the drawings and the claims. There is, of course, no one better qualified to check the technical accuracy of the description and drawings than the inventor himself. The language and form of the claims, however, may at first be somewhat confusing. Nevertheless, as previously noted, an inventor can often arrive at sound conclusions as to whether a given claim or claims really captures the full scope of his invention. In any

event, the application checking process should never be considered as a perfunctory chore by an inventor. If the checking is done carefully, it becomes an important part of the type of cooperative effort that is needed to produce strong patents.

THE FINISHED PRODUCT

Feedback believed that in his review of the draft application, other opinions in addition to his own might be valuable. For that reason he discussed the application with his associate, B. I. Nary. He also solicited the advice of his patent-wise supervisor, Mr. I. M. Sage. As a result, when Feedback returned the application to the Patent Department, he did so with the assurance that his approval was supported by the opinions of other specialists in the cold cathode tube field. When the approved application was returned to Corpus, he initiated the preparation of the final form or smooth copy, together with a number of associated legal documents. Feedback's signature was required on a number of these documents—the Petition and Power of Attorney, a formal request for patent combined with a power of attorney grant from Feedback to Corpus; the Assignment, assigning Feedback's interest to the Laboratories; the Application itself and the Oath. The Oath is a sworn statement by the inventor that he believes himself to be the original, first inventor, that he does not know or believe that the invention was ever known or used before his invention or patented or described in any printed publication before his invention or more than one year prior to the application, or in public use or on sale in the United States for more than one year prior to the application.

So, in effect, the inventor is required to swear that, to the best of his knowledge, his application is not blocked by any of the listed statutory bars. With the signing completed, the entire packet of papers was sent off to the Patent Office, a part of the Department of Commerce in Washington, D. C.

ACTION BY THE PATENT OFFICE

No action was taken by the Patent Office for a period of several months. The time of the initial action by the Patent Office varies but, as a result of the heavy work load handled there, an appreciable delay is generally to be expected. The work at the Patent Office end of the line is performed by Patent Examiners, all of whom are specialists in their particular fields of subject-matter.

In considering a patent application, a Patent Examiner goes through somewhat the same procedure initially performed by the patent attorney—he conducts a patentability study or search. After comparing the subject-matter of the application with the most similar matter that has already been patented or otherwise disclosed, the Patent Examiner reaches his conclusions as to whether the application meets the various requirements for patentability—invention, novelty and utility. It is an unusual case indeed in which a Patent Examiner concludes that the entire application as initially prepared meets all requirements. Normally, the Examiner prepares a paper called an Office Action, stating his objections and reasons therefor—that some technical requirement has not been met, or that the claims are too broad in scope or that some or all of the claims have been anticipated by the work of others.

When H. Corpus received the first Office Action, he was allowed the usual period of six months in which to reply. In order to meet the objections of the Examiner, Corpus made certain changes in the specification, cancelled one of the claims, redrafted other claims and prepared several additional claims—a fairly typical sort of procedure. In order to meet other objections of the Examiner, Corpus cited authorities and arguments to persuade the Examiner that his objections were not well taken. In the preparation of his answer to the Examiner, termed an Amendment, Corpus again enlisted the aid of Feedback in order to be certain that the various changes made were accurate from the standpoint of technology.

AN INTERFERENCE PROCEEDING

After the second interchange of Office Actions and Amendments between the Patent Office and H. Corpus, Corpus felt fairly confident that the application would finally be allowed and that a patent would be granted. At about this time, however, a completely new development entered the picture—and a rather unhappy development at that. The Patent Office notified both Corpus and Feedback that an interference involving Feedback's application had been declared. Corpus got in touch with Feedback almost immediately, knowing of course that Feedback's help would be required. Feedback was perfectly willing to help, although he had some doubt as to whether being a party to an interference action was a good situation or a bad one. To be sure that Feedback was aware of what was involved, Corpus arranged for an informal conference and briefly explained the situation. The explanation was along the following lines.

An interference is a proceeding in the Patent Office to determine which of two or more inventors claiming the same invention is the first inventor and entitled to a patent. The interference may be between pending applications for patent or between an application and an issued patent. When a Patent Examiner discovers a situation calling for an interference proceeding, he notifies the parties involved. The parties are allowed a fixed period of time to file a paper called a Preliminary Statement. In the Preliminary Statements, each party must allege a number of facts. These facts include the following: The dates of the first drawing and written description of the invention; the date the invention was first disclosed to another; the date of the first act or acts of any other kind which, if proved, would establish conception of the invention; the date of the reduction to practice of the invention and the date when the inventor began exercising reasonable diligence toward reducing the invention to practice.

The facts alleged in the Preliminary Statement must of course be accurate because these are the facts which the party may later be called upon to prove. It is particularly important that the

various dates claimed in the Preliminary Statement be precisely accurate for a party is bound by the dates alleged. For example, a party who alleges in his Preliminary Statement that he conceived his invention in January of 1951 cannot later obtain the full benefit of proof that the conception actually took place in June of 1950.

Evidence in an interference proceeding is taken by depositions, recorded sworn questions and answers that are sent to the Patent Office. The party who filed his patent application first has a very important advantage in this connection. He is designated as the senior party. The burden of proof is placed on the junior party, the party who filed last. The junior party must at least be able to prove that he conceived his invention prior to the time that the senior party filed his application with the Patent Office. Failing in this, the junior party will lose the interference, and the patent may then issue to the senior party without the introduction of further evidence on his behalf. Assuming that the junior party can prove conception prior to the senior party's filing date and either reduction to practice or diligence toward a reduction to practice, the senior party must then introduce evidence concerning his own dates of conception and reduction to practice. As in any court of law, the case then rests on the evidence introduced by both parties. The evidence is reviewed by a Patent Office tribunal—the Board of Interference Examiners—after briefs have been filed and oral arguments have been presented by the attorneys for the parties to the interference. After the Patent Office announces a decision, the losing party has the opportunity to appeal to the Court of Customs and Patent Appeals or to initiate a new trial on the merits before a Federal District Court.

The rules of priority on which decisions in interference actions are based are as follows:

1. The *first* to conceive *and* the *first* to reduce to practice will always win.
2. The *first* to conceive and the *last* to reduce to practice will win if he can prove diligence on his part started

before the other party conceived and continued until his own reduction to practice.

3. The *last* to conceive but the *first* to reduce to practice will win in the event the other party fails to prove diligence.

For an inventor, the most important point to remember about these rules is the fact that the party who proves he was the first to conceive the invention will not necessarily prevail. He may also have to prove diligence and reduction to practice. Note the repeated emphasis on the need for proof—which in essence means notebook records, witnesses and adequate corroboration, all responsibilities of the inventor.

From this brief explanation, at least two alarming facts became painfully clear to our inventor, Ned Feedback. First, notwithstanding all of his own hard work and the many hours of effort expended by H. Corpus, there was at least a reasonable chance that the patent for the cold cathode stepping tube might be awarded to another inventor. Second, a large share of the responsibility for winning or losing would rest on Feedback's shoulders—on whether he could produce evidence from his own records that would stand up in court.

Corpus and Feedback worked together on the preparation of the Preliminary Statement. Fortunately, Feedback had been fairly meticulous in his invention record keeping habits. There were no loose scattered papers containing laboratory notes to be searched for. And there was no need for Feedback to engage in a frantic search of his memory trying to recall events concerning his invention that had taken place four years previously. In line with established practices Feedback's notebook had long since become a part of the files maintained for the permanent preservation of Laboratories records. There he found the all important dates recorded and witnessed—the conception on September 10, 1946 and the reduction to practice on January 24, 1948.

As the interference proceeding developed, however, it became obvious that, in order to win, more would be required than the production of a few quick and ready dates from Feedback's notebook. The opposing party in the interference had filed his application before Feedback. Feedback was therefore the junior party and the burden of proof was on him.



A laboratory notebook vs. scratch paper.

As it turned out, Feedback, with the help of B. I. Nary, who had witnessed his notebook entries, was able to prove that his conception of the invention took place prior to the conception by the senior party. But the date of reduction to practice by the senior party was proved to be earlier than Feedback's. And so the determination of the case boiled down to the question of whether Feedback could prove that he had exerted reasonable diligence in perfecting his invention. Recalling Corpus' earlier explanation to Feedback, the rule of law in such cases requires that proof of diligence must start from a point prior to conception by the opposing party. Moreover, the proof must show that diligence continued until the invention was reduced to practice. Here Feedback was on shaky ground.

Going back to Feedback's notebook, there was one period of several months during which no entries had been made concerning the cold cathode stepping tube. Feedback had in fact continued his work during that period and had conducted a number of unsuccessful experiments. But these experiments had not been

recorded. Moreover, immediately preceding this gap in the written record, there was an entry in the notebook which stated that the project had been abandoned. In view of the lack of proper entries in Feedback's notebook, the chances of establishing the fact that Feedback had been diligent appeared to be slim indeed.

Feedback didn't enjoy the interference proceeding at all. He was subjected to the discomforts of rigorous cross-examination—and he fervently wished that he had known *all* the rules about invention record keeping—at the time when it would have done him some good. One of the most disturbing aspects of the whole affair to Feedback was the knowledge that his own sworn testimony, by itself, was never considered to be sufficient. It was always necessary to have his word backed up or corroborated by additional evidence. The fact that Feedback's professional and personal reputation for integrity and honesty were of the highest order made not one whit of difference.



And still they won't believe him—without corroboration.

But despite Feedback's difficulties, the situation was brightened considerably by some convincing evidence of diligence that had been located in the Laboratories files—evidence that could help to overcome the adverse notebook record. This evidence included several engineering drawings—drawings that had been prepared during the period in which Feedback's notebook entry of "aban-

donment" and the gap in subsequent entries indicated a lack of diligence. Fortunately, these engineering drawings of the cold cathode tube had been properly signed and dated. In addition, there were dated and signed shop orders for the construction of various tube components. These were corroborated by the shop technicians involved—further proof of diligence—proof that work on the tube had continued.

After both parties to the interference had concluded the presentation of evidence, Corpus and the opposing counsel submitted briefs and presented oral arguments. Several months passed before the Board of Interference Examiners announced a decision. To the immense relief of both Corpus and Feedback, it was held that Feedback had been diligent in reducing his invention to practice and, since he had been the first to conceive the cold cathode stepping tube, he was the "first inventor" and therefore entitled to the patent.

So the episode of Feedback's interference action had a happy conclusion after all. In due course, the official patent grant, the impressive document adorned with Ned Feedback's name, a red seal and a blue ribbon, was received by the Laboratories for safe-keeping in the patent files.

When Feedback received his personal copy, he couldn't help but reflect a little on the tortuous procedure that was behind the patent. On one hand, he allowed himself a measure of understandable pride. After all, he was the patentee of a rather significant invention. Furthermore, the Patent Department never would have been able to win the interference proceeding had it not been for his notebook—his careful entries that were always dated and signed and witnessed. On the other hand, it was literally frightening to think how the patent was very nearly lost because he didn't know about the importance of being able to prove diligence. Of course, one circumstance on the constructive side of the ledger was the fact that Feedback did have the advantage of a very thorough lesson on the importance of invention record keeping. We must admit, however, that an interference action may be an extremely expensive way to learn.

The reader should not infer from Feedback's involvement in an interference action that a similar procedure results in every patent prosecution. Actually, interferences arise rather infrequently. As far as the great majority of patent applications are concerned, this need to prove conception, diligence and reduction to practice never arises. The application is submitted to the Patent Office; the Patent Examiner eventually makes a final ruling that the application is allowable or not allowable in whole or in part; and, barring an appeal or an action in a Federal District Court, the procedure is finished. It is perhaps sufficient to add, however, that when an interference is declared, the evidence that a properly kept laboratory notebook can provide may become as valuable as the invention itself.

Certainly more could be written on the subject of patent prosecution—at least enough to fill several volumes. It seems doubtful, however, that such additional material would give much in the way of useful information to a Laboratories inventor. An inventor who retains the high points noted in the following summary will be sufficiently well prepared to guard against most of the pitfalls he might encounter during the period of patent prosecution.

SUMMARY

Before an application for patent is filed by the Laboratories Patent Department, the inventor is always requested to check the application to insure that it meets with his approval as far as matters of technology are concerned. The inventor should perform this task carefully—checking the specification or description, the drawings and the claims. The inventor should not hesitate to seek the opinions and advice of his associates and his supervisor if such action appears to be desirable. After the application is filed, a period of a year or more may elapse before any action is taken in the Patent Office. The first step in the process usually takes place when the Patent Examiner informs the applicant, through his patent attorney, that certain revisions must be made in the application or that, for one reason or another, the subject-

matter cannot be patented. The attorney replies to these Office Actions by written Amendments until the application is finally rejected or finally allowed. The inventor is frequently requested by the attorney to furnish additional information to aid in the preparation of Amendments. Appellate procedures are available if an applicant wishes to have the decision of the Patent Office reviewed.

Normally an inventor is not required to submit any information or proof as to when he conceived his invention, when he reduced it to practice or any other like matter. The opposite is true, however, when the Patent Office declares an interference. An interference is a proceeding to determine which of two or more inventors claiming the same invention is entitled to patent protection. This determination is made on the basis of evidence presented by the parties. Evidence must be corroborated. The word of the inventor standing alone is never sufficient to establish conception, diligence or reduction to practice. In determining which party in an interference prevails—

the party first to conceive and first to reduce to practice always prevails;

the party first to conceive and last to reduce to practice will prevail *if* the requirement as to diligence is met.

The party who prevails in an interference is the party who, in the usual course of events, will receive patent protection on his invention. Appellate and other procedures are available if a party to an interference wishes to have the initial decision of the Patent Office reviewed.

Whether an interference is won or lost is frequently determined by the records kept by the inventor. It is awkward, to say the least, for an inventor to find himself unable to furnish proper records when they are required.

REVIEW THE CHAPTER II SUMMARY NOW

CONCLUSION

The title "An Introduction to Patents" was carefully selected. The reader should be reminded again, however, that no attempt has been made here to furnish Bell Laboratories inventors with a complete reference book. As a result, a number of extremely important facets of Bell System patent work have been given a very cursory treatment, or omitted entirely—for example, the filing of applications in foreign countries, the essential patent work done by the patent staffs of the American Telephone and Telegraph Company and the Western Electric Company, as well as several Patent Department functions that did not come to Feedback's attention.

In all fairness to the true inventor of the cold cathode stepping tube, it should be pointed out again that he was involved in none of the assorted errors that plagued our fictional inventor, Ned Feedback. Moreover, the true inventor's complete familiarity with patent matters is certainly a more accurate reflection of an experienced Laboratories inventor than the trials and tribulations of Feedback. Nevertheless, no one is immune from the common pitfalls illustrated. The only real protection against them is a continuous patent consciousness. An occasional review of "An Introduction to Patents" may be helpful toward that end.



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